# Application of *Kaizen* Methodology to Foster Departmental Engagement in Quality Improvement

Paul Knechtges, MD[a], Michael Christopher Decker, MD[b]

The Toyota Production System, also known as Lean, is a structured approach to continuous quality improvement that has been developed over the past 50 years to transform the automotive manufacturing process. In recent years, these techniques have been successfully applied to quality and safety improvement in the medical field. One of these techniques is *kaizen*, which is the Japanese word for "good change." The central tenant of *kaizen* is the quick analysis of the small, manageable components of a problem and the rapid implementation of a solution with ongoing, real-time reassessment. *Kaizen* adds an additional "human element" that all stakeholders, not just management, must be involved in such change. Because of the small size of the changes involved in a *kaizen* event and the inherent focus on human factors and change management, a *kaizen* event can serve as good introduction to continuous quality improvement for a radiology department.

**Key Words:** Lean, *kaizen*, continuous quality improvement, change management, practice quality management

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## INTRODUCTION

With the increasing regulatory pressure on the medical field, quality improvement programs have shifted from being a competitive advantage to a practice necessity. This increased pressure for performing quality improvement has arisen both internally from the American Board of Medical Specialties and externally from CMS. For example, the ABR currently requires practice quality improvement (PQI) projects for its Maintenance of Certification [1]. In addition, CMS will begin applying payment adjustments to eligible physicians who do not satisfactorily report data on quality measures for covered professional services in 2015 [2].

Although quality improvement programs may be relatively new to many radiologists, they have been used in other industries for decades. In recent years, selected business strategies have been successfully imported to improve quality and patient safety in the medical field [3-8]. One such strategy is the Toyota Production System, also known as Lean. Over the past 50 years, this methodology has been developed by Toyota to transform the automotive manufacturing process. More recently, this methodology has been successfully tailored to health care environments [9,10].

Although there are many components of Lean, this article focuses on a *kaizen* event, which can serve as a relatively simple introduction to continuous quality improvement.

## DEFINING THE ROLE OF *KAIZEN* IN THE LEAN PROCESS

Lean is a structured approach to quality improvement that seeks to deliver additional value by reducing waste through continuous quality improvement [4]. In patient care, the value added of a diagnostic radiologist is largely defined by rendering accurate, timely diagnosis and reports [11]. Alternatively, waste is any distraction that does not contribute to patient care (Table 1) [12].

The word *kaizen* in Japanese simply means "good change" or "improvement." It is a set of practices that focus on continuous quality improvement. The central tenant of *kaizen* is the quick analysis of the small, manageable components of a problem and the rapid implementation of a solution with ongoing, real-time reassessment (Table 2) [4]. This is typically referred to as a "*kaizen* event." Many will note that this is very similar to the plan-do-study-act (PDSA) cycles the ABR encourages in its PQI programs [1]. Lean or *kaizen* adds an additional "human element": that all stakeholders, not just management, must meet and agree to what adds

[a]Department of Radiology, Medical College of Wisconsin, Milwaukee, Wisconsin.

[b]Department of Emergency Medicine, Medical College of Wisconsin, Milwaukee, Wisconsin.

Corresponding author and reprints: Paul Knechtges, MD, Department of Radiology, Froedtert Hospital, 9200 W. Wisconsin Ave, Milwaukee, WI 53226; e-mail: pknechtges@mcw.edu.




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**Table 1.** The 8 wastes

| Waste | Examples |
|---|---|
| Transportation: unnecessary handoffs, transfers, filing, and distances of materials and information | Waiting for paper requisitions to arrive instead of using a paperless workflow |
| Inventory: information or material waiting in queue | Allowing unread studies to "pile up" at one workstation during a surge in volume instead of distributing them to other radiologists |
| Motion: unnecessary motion, travel, walking, or searching | Nonstandard, cluttered workstations that require constant hunting for required equipment and information |
| Waiting: waiting for machines, information, or people | Long boot-up times for computers or long load times for studies |
| Overproduction: producing more than is needed or before it is needed | Obtaining more MRI sequences than are needed for a given indication |
| Overprocessing: redundant or unnecessary mental or physical work | Issuing separate handwritten preliminary reports and digital final reports when a computerized dictation system is available |
| Defects: work done because of errors in the previous process | Patient "callbacks" for improperly protocoled CT or MR studies |
| Skills: not using the talent of the staff to the fullest ability | Hiring additional interventional radiologists to perform procedures that could be performed by midlevel providers (eg, uncomplicated, high-volume paracentesis) |

value to a process and what constitutes waste before implementing a change [4].

When performed properly, *kaizen* not only eliminates unnecessary work but builds consensus and enthusiasm for change and teaches people a systematic, scientific method for identifying and eliminating waste in a process [13].

## KEYS TO SUCCESS

There are multiple different quality improvement tools and strategies that can potentially benefit radiology practices (eg, Lean, Six Sigma, failure mode and effects analysis, root-cause analysis) [3,4]. Although a complete discussion of each is beyond the scope of this article, no one of these strategies is considered to be a "one-size-fits-all" solution to quality assurance or process improvement. Before applying a specific quality assurance strategy, it is important to understand both its capabilities and limitations.

Support from leadership is essential for success [4]. Leaders will provide the necessary support you may need in time and resources to do improvements. Quality improvement projects that align with an institutional goal or address a significant quality assurance issue are more likely to receive institutional support. Picking the right stakeholders of the process you are improving is critical for buy-in and sustainability after the improvements are made. Scaling the improvement to the smallest meaningful improvement is a valued skill to be learned and aligns well with introductory improvement projects.

Although it can be applied at an institutional level, *kaizen* can also be readily applied to the local work area (Table 2). In fact most, *kaizen* events should be done at the local level. A project can be implemented in a single work area and demonstrate visible results in a relatively short period of time. *Kaizen* and Lean principles are generally understandable to all members of the team, as they do not routinely require a background in engineering or mathematics to be understood. These factors can help make a department's first attempt at a quality improvement project less threatening and more relevant to all involved. In addition, these attributes of Lean and *kaizen* can help lessen resistance to future quality improvement projects.

## A PRACTICAL EXAMPLE

*The framing of a problem is often far more essential than its solution.*

—Albert Einstein

Before embarking on a quality improvement project, it is vital to have a strong understanding of the problem. Collecting baseline data is vital for determining the impact of a perceived problem or source of waste. In most medical practices, a small number of carefully selected and tightly focused projects can yield far greater results than a larger number of projects that may being performed simply to fulfill institutional or regulatory requirements to demonstrate an active quality improvement process [3]. *Kaizen* events are particularly well suited for addressing small, manageable, focused problems [4]. Addressing such "low-hanging fruit" with "common-sense" solutions can have a significant impact on a practice. Selection of the initial *kaizen* project should involve relatively conspicuous waste that the majority of